

Amendment, Response and RCE under 37 CFR § 1.114

Serial Number: 10/724,432

Filing Date: November 28, 2003

Title: APPARATUS AND METHOD FOR A HIGH-EFFICIENCY SELF-CLEANING CENTRIFUGE

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### REMARKS

Applicants have filed an RCE herewith. Applicants have carefully reviewed and considered the Office Action mailed on January 19, 2006, and the references cited therewith. Claims 1, 13, 14, 18, 21, 22, 23, 26, 27 and 28 have been amended, claims 2-12 were previously cancelled, and new claims 32 and 33 have been added, to more fully describe the claimed invention. No new matter is added. The following is a description of the support found for these amended and new claims:

The amendment to Claim 1 is supported by paragraphs 30, 31, 32, 41 and 52.

The amendment to Claim 13 is supported by paragraphs 18, 44, 46, 48 and original claim 13.

The amendment to Claim 14 is supported by paragraphs 46 and 48.

The amendment to Claim 18 is supported by the title and paragraphs 9, 31, 46, 47 and 48.

The amendment to Claim 21 is supported by paragraphs 44 and 32, and original claim 1.

The amendment to Claim 22 is supported by paragraph 31.

The amendment to Claim 23 is supported by paragraphs 13 and 49.

The amendment to Claim 26 is supported by paragraphs 46, 48 and 53.

The amendment to Claim 27 is supported by paragraphs 13, 14, and 53.

The amendment to Claim 28 is supported by paragraph 32, 49, 50, and 51 and original claim 7.

The amendment to Claim 32 is supported by paragraphs 22, 30, 32, 40, 44, and 48.

The amendment to Claim 33 is supported by paragraphs 22, 30, and 44.

### Title of the invention

In paragraph 6 of the Final Office Action, the Examiner objected to the title as not descriptive because of not mentioning concentric cylinders. Applicants respectfully traverse since the title was already sufficiently descriptive of the claimed invention. However, to move

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prosecution, Applicants have again amended the title to read "APPARATUS AND METHOD FOR A HIGH-EFFICIENCY SELF-CLEANING CENTRIFUGE HAVING CONCENTRIC CYLINDERS". Withdrawal of the objection is respectfully requested.

### Specification

In paragraph 8 of the Final Office Action, the Examiner objected to the specification as not providing textual antecedent basis for the amendment to claim 1. Applicants have amended the specification after paragraph 32 and before paragraph 33 of the application as published, by an amendment supported by the figures in the original application:

Figure 1, Figure 4, and Figure 7 show a rotor assembly supported for rotation about an axis, the rotor assembly having a first set and a second set of nested cylinders, according to some embodiments of the invention. Each set of cylinders includes a plurality of concentric cylinders, each cylinder having one or more openings at a first end and one or more openings at an opposite second end. The cylinders define a plurality of concentric liquid passageways configured for parallel unidirectional flow of the liquids through the plurality of concentric liquid passageways.

Reconsideration of the objection and an early notice of allowance are respectfully requested.

### Response to Rejection Under 35 U.S.C. § 102(b) of Claims 1, 13, 18, 21, 22, and 25 in View of Pelzer et al. (United States Patent No. 4,030,897)

Applicants have considered the Examiner's rejection under 35 U.S.C. § 102(b) of claims 1, 13, 18, 21, 22 and 25 in view of Pelzer et al. and respectfully traverse. Relative to paragraph 10 of the Office Action, the present invention is distinct from Pelzer et al. In Pelzer et al., a centrifuge is described wherein one set of concentric skirts are stationary, and a second set of skirts move rotationally about (i.e., move around) this first set of stationary skirts. (See Col. 3, lines 1-5. Also see abstract: "two sets of coaxially mutually fitting cylinders, the set (=rotor) with the rotating cylinders rises from the floor 7, while the other set (=stator) descends from the lid 3 and is static.") In contrast, Claim 1 of the present invention recites "a rotor assembly

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supported for rotation about an axis, the rotor assembly having a first set and a second set of nested cylinders" which describes a first set and a second set of concentric cylinders that are both supported for rotation. Accordingly, Pelzer et al. do not teach, describe, or suggest the present claimed invention.

Moreover, in Pelzer et al., a centrifuge is described that is used in the degassing of liquids. Specifically, a liquid is placed into a multi-skirt centrifuge, and exposed to the rotational movement of concentrically arranged skirts in a **serial bidirectional** path (i.e., the liquid moves in a serpentine path moving upward against one rotating cylinder, then downward along the next-outward stationary cylinder). This liquid is fed into an inner portion of this multi-skirt centrifuge, and then passes in a **serial** manner through successive outward-moving passageways (see arrows showing the flow direction in Pelzer et al. Figures 1, 2, and 3; Col. 3, lines 50-68.) There are not openings at both the first and second ends of the cylinders, since that would allow the liquid to escape and not follow the serpentine path. In contrast, the present claimed invention feeds liquid through passageways in a **parallel unidirectional** flow. Accordingly, the present invention is distinct from that described by Pelzer et al. since Pelzer et al. do not teach, describe, or suggest the present claimed invention. Reconsideration of the rejection and an early notice of allowance are respectfully requested.

*Response to Rejection Under 35 U.S.C. § 102(b) of Claims 1, 13, 18, 21, 22, and 25 in View of Strid et al. (United States Patent No. 5,935,053)*

Applicants have considered the Examiner's rejection under 35 U.S.C. § 102(b) of claims 1, 13, 18, 21, 22 and 25 in view of Strid et al. and respectfully traverse. Relative to paragraph 11 of the Office Action, the present invention is distinct from Strid et al. Strid et al. describes a fractionator (similar to a roller mill, not a centrifuge) having a single set of concentric cylinders. The cylinder walls that make up the channels in Strid et al. are tightly connected to a circular end plate. (See Col. 3, lines 36-39.) These cylinders are connected such that they cannot rotate relative to one another. Applicants believe that claim 1 already distinguished over Strid et al., but have amended claim 1 to explicitly recite distinctive features. Claim 1 recites "a first set and a second set of nested cylinders, each set having a plurality of concentric cylinders, wherein the

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first set and the second set are both supported for rotation and supported for rotation relative to each other." Accordingly, the present invention is distinct from that described by Strid et al. since Strid et al. do not teach, describe, or suggest the present claimed invention.

Strid et al. disclose a relatively slow tumbler, not a centrifuge as described in the present invention. The apparatus of Strid et al. would fail to provide its current function were it modified to rotate as centrifuge speeds such that the material in the cylinders were thrown against the cylinder walls, since Strid et al. require the material roll down the cylinders. Further to the point, Strid et al. have horizontal flow through a set of cylinders all attached to one another and thus cannot be self cleaning, whereas the present invention provides a self-cleaning centrifuge by providing differential rotation (for example, but not limited to, by braking one set of cylinders).

Thus, the device described in Strid et al. uses low rotational speeds that are typically around 4 rpm. (See Col. 1, lines 66-67.) These low rotational speeds are used during the course of pushing fractionate out of the tumbler through one or more of three outlets Nos. 13, 14, and 15. (See Col. 4, lines 64-67.) Accordingly, the present invention is distinct from that described by Strid et al. since Strid et al. do not teach, describe, or suggest the present claimed invention. Reconsideration of the rejection and an early notice of allowance are respectfully requested.

*Response to Rejection Under 35 U.S.C. § 103(a) of Claim 20 Over Pelzer et al. (United States Patent No. 4,030,897) or Strid et al. (United States Patent No. 5,935,053) in View of Dudrey (United States Patent No. 3,861,584)*

Applicants have considered the Examiner's rejection under 35 U.S.C. § 103(a) of claim 20 over Pelzer et al. or Strid et al. in view of Dudrey, and Applicants respectfully traverse. In contrast to paragraph 14 of the Office Action, the present invention is distinct from the above-cited combination of prior art references. Neither Strid et al. nor Pelzer et al. nor a combination provide the recited structure of the present claims. Changing Strid et al. (which sorts particle sizes with a fractionator) or Pelzer et al. (which removes gas from a liquid) by adding Dudrey to provide liquid from a machine tool would destroy the functionality provided by Strid et al. or Pelzer et al. – they do not function to centrifuge machine tool debris from a liquid. Thus, the

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Examiner has failed to make a prima facie case of obviousness. In addition, the above-cited prior-art combinations fail to render obvious the limitations of amended claim 1 upon which claim 20 depends. Amended claim 1 describes a limitation wherein a first set and a second set of concentric cylinders are both supported for rotation and supported for rotation relative to each other. This limitation is nowhere to be found in the above-cited combination of prior art references. Accordingly, the present invention recited in claim 20 appears allowable over the cited references, and reconsideration of the rejection and an early notice of allowance are respectfully requested.

*Response to Rejection Under 35 U.S.C. § 103(a) of Claims 23-24 Over Strid et al. (United States Patent No. 5,935,053) in View of Dudrey (United States Patent No. 3,861,584)*

Applicants have considered the Examiner's rejection under 35 U.S.C. § 103(a) of claims 23-24 over Strid et al. in view of Dudrey and Applicants respectfully traverse. Contrary to paragraph 15 of the office action, there is no motivation in the prior art for combining the references as suggested by the Office Action. The device of Strid et al. is a fractionator that does not accumulate solids on the horizontal cylinders walls because of the slow rotation. Further, if the device of Strid et al. were modified to have a braking step, the solids would not drop out, but would accumulate in the bottom of the horizontal cylinders -- not purging solids from the cylinders -- and perhaps further clogging the device. A modification to make Strid's cylinders vertical would remove the rolling action of the liquid moving through the fractionator, destroying its functionality. Thus, the Examiner has failed to make a prima facie case of obviousness since the motivation is lacking and the modification does not result in the present claimed invention. In contrast, amended claim 23 discloses selectively braking the first set of concentric cylinders, providing a shearing action to purge accumulated solids. Accordingly, the claims 23-24 appear allowable over the cited references, and reconsideration of the rejection and an early notice of allowance are respectfully requested.

Based upon the above arguments and pursuant to the Examiner's statements in the Interview Summary dated February 15, 2006 (*see* Interview Summary, pg. 5.), Applicants have

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placed the allowed subject matter of claim 14 into independent form, and the other claims into a condition for allowance. Accordingly, reconsideration and an early notice of allowance are respectfully requested.

### CONCLUSION

An RCE and additional nine (9) amended claims and two (2) new claims are presented. Applicants respectfully submit that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicants' attorneys Theodore C. McCullough (952-278-3508) or Charles A. Lemaire (952-278-3501) to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account Number 502931.

Respectfully submitted,

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By their representatives,

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